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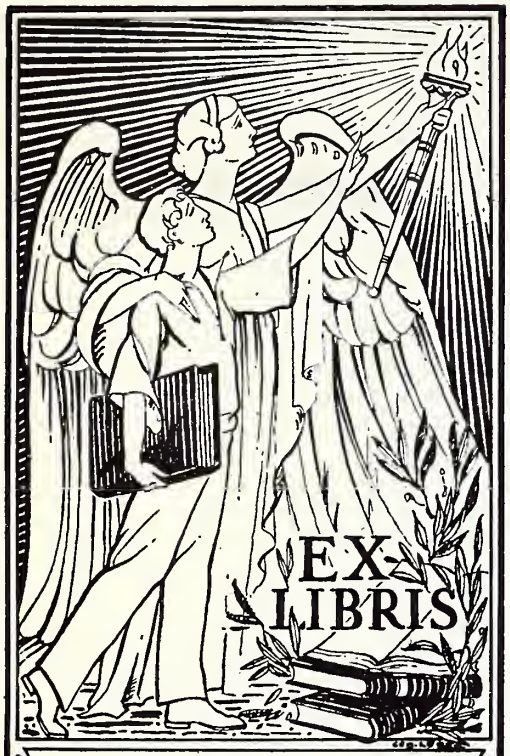


AMERICAN FOUNDATION
FOR THE BLIND INC.

CONSERVATION IN ACTION

WHEELER

a National Wildlife Refuge

mber SEVEN

h and Wildlife Service, United States Department of the Interior, Washington, D. C.

UNITED STATES DEPARTMENT OF THE INTERIOR, J. A. Krug, *Secretary*
FISH AND WILDLIFE SERVICE, Albert M. Day, *Director*

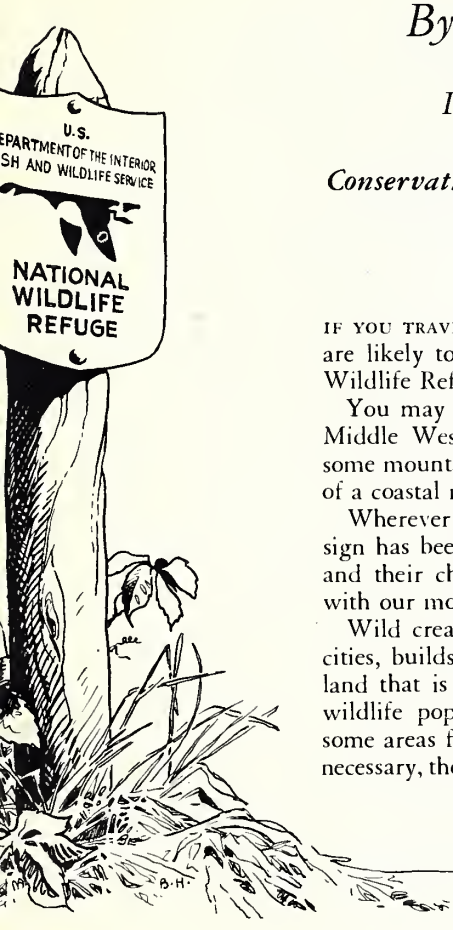
WHEELER

A NATIONAL WILDLIFE REFUGE

By Thomas Z. Atkeson

Illustrations by Bob Hines

Conservation in Action NUMBER SEVEN



IF YOU TRAVEL MUCH in the wilder sections of our country, sooner or later you are likely to meet the sign of the flying goose—the emblem of the National Wildlife Refuges.

You may meet it by the side of a road crossing miles of flat prairie in the Middle West, or in the hot deserts of the Southwest. You may meet it by some mountain lake, or as you push your boat through the winding salty creeks of a coastal marsh.

Wherever you meet this sign, respect it. It means that the land behind the sign has been dedicated by the American people to preserving, for themselves and their children, as much of our native wildlife as can be retained along with our modern civilization.

Wild creatures, like men, must have a place to live. As civilization creates cities, builds highways, and drains marshes, it takes away, little by little, the land that is suitable for wildlife. And as their space for living dwindles, the wildlife populations themselves decline. Refuges resist this trend by saving some areas from encroachment, and by preserving in them, or restoring where necessary, the conditions that wild things need in order to live.

Cover: Mallards in refuge sloughs

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Wheeler

A NATIONAL WILDLIFE REFUGE

DRIVING NORTH FROM BIRMINGHAM, ALA., along United States Highway No. 31, the summer motorist leaves the low mountains of northern Alabama and descends into the broad, fertile valley of the Tennessee River. As the highway reaches the valley, the land becomes level and the forest all but disappears. Broad fields of cotton stretch into the distance on either side of the road. Farmhouses dot the landscape and thriving communities and small towns appear every few miles.

The motorist sees the tall steel transmission towers of the Tennessee Valley Authority extending across the landscape, bearing thousands of volts of electricity to light the cities of the valley and turn the wheels of its industries. From time to time, as the irregular boundary of a national wildlife refuge nears or touches the highway, he sees the flying goose refuge markers of the Fish and Wildlife Service through the shimmering heat waves, and behind them fields of soybeans, alfalfa, and tall green corn. He may wonder idly what sort of refuge this is, located in a densely populated, highly agricultural section, and what wildlife it shelters and supports. If our motorist friend is a hunter or is familiar with the ways of waterfowl, he would be amazed to learn that the first frosts reaching the Tennesse Valley bring thousands of ducks and geese to the haven behind these refuge signs, and that many of the birds spend the winter feeding in the marshes and in the fields that have been planted with crops in anticipation of their coming.

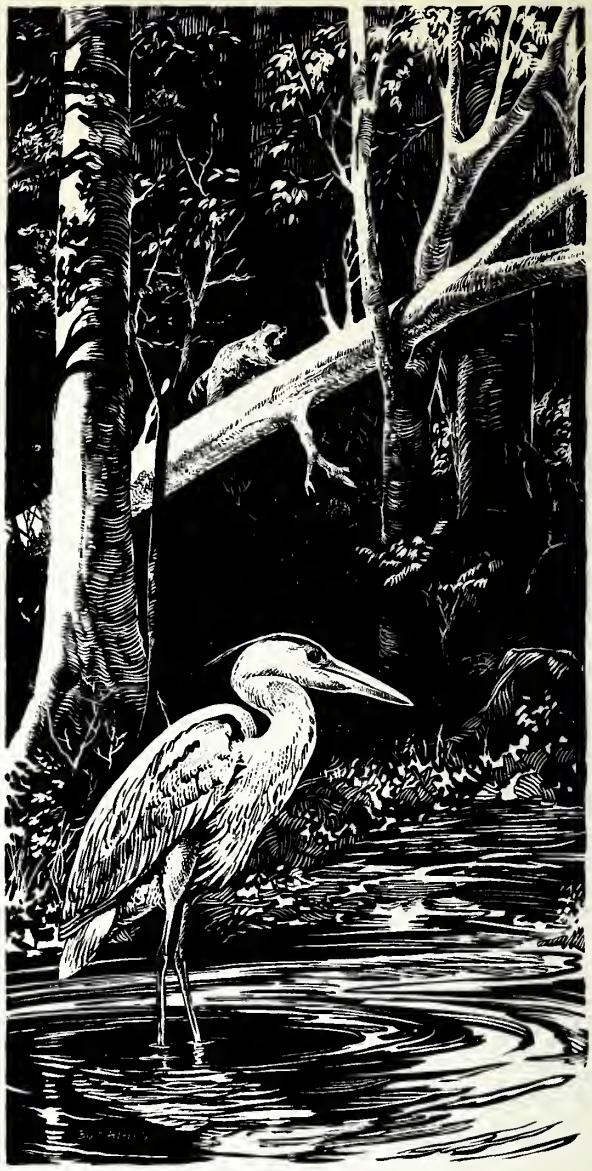
In 1933, Congress established the Tennessee Valley Authority, and work on this great project began almost immediately. Hundreds of thousands of acres of land were purchased. Whole forests were removed to prepare beds for the reservoirs. Construction began on the dams which were eventually to impound the Tennessee River from its utmost tributaries. It was evident that the creation of almost 700,000 acres of impounded water could be of considerable importance to ducks and geese. The policy of the Tennessee Valley Authority was to consider all land and water under the jurisdiction of the Authority a public hunting and fishing area. The need for a refuge somewhere in the chain of man-made lakes was apparent.

In 1936, field biologists of the Bureau of Biological Survey, now part of the Fish and Wildlife Service, began investigating the newly created reservoirs and proposed reservoir sites for the best location for such a refuge. Wheeler Dam had been recently completed, and its res-

ervoir lay almost in the geographic center of the chain of impoundments. It had formed many shallow sloughs and backwaters, interspersed with islands and peninsulas and was considered good potential waterfowl habitat. It seemed the logical choice for a sanctuary, especially since there was then no other national wildlife refuge in either Alabama or Tennessee. The Federal reconnaissance biologists, together with members of the Alabama Department of Conservation and the Tennessee Valley Authority Division of Biological Readjustment, decided upon the block of land and water beginning at the city of Decatur, Ala., and extending up river some 15 miles. This section covered approximately the middle third of the Wheeler reservoir. In 1938, an Executive order set aside this area as the Wheeler National Wildlife Refuge. Originally it embraced more than 45,000 acres of land and water, but the boundary has since been modified and the present area is approximately 38,500 acres.

The Wheeler Refuge is unique among the many Federal refuges scattered over the length and breadth of the United States. It is on none of the traditional routes of bird migration, but lies just east of the Mississippi flyway. It is the first refuge to be located on a reservoir built primarily for electric power production, navigation, national defense, and flood control. It is in the center of a densely populated, highly agricultural section with rapidly expanding industries. The waters have been subjected to intensive treatment to control malaria-bearing mosquitoes.

There were many who thought that conditions on the newly established refuge could never be made suitable for wildlife, but the Federal biologists took a different view. They pointed out



The area has proved attractive to many forms of wildlife. Raccoons and other fur bearers live in the timber and thickets, and the watery edges offer hunting grounds for the great blue and other herons.

that the growing Nation was turning more and more to the control of water power; these projects eventually might include most of the great river systems of the continent. Why not, they argued, begin experimental work to determine how these impoundments could be made valuable to waterfowl? Most of the natural habitat of ducks, geese, and shore birds was being ruined by rapidly developing agriculture and industry. Perhaps the new power reservoirs would in some measure create new waterfowl habitat to replace what had been lost.

In order to test this proposal, efforts to correlate waterfowl interests with navigation, power production, and flood and malaria control began immediately. Biologists set to work to develop methods of managing the land and water in the best way possible to serve all these interests. Power production and flood control were of primary importance and could be little changed, but malaria-control practices were modified so as to cause the least possible interference with wildlife and its food and cover. The waters of the reservoir were subject to an annual fluctuation of more than 6 feet and at times of high floods to a maximum fluctuation of more than 10 feet. Under these conditions, the aquatic vegetation that normally furnishes food for ducks and geese could not grow. An artificial food supply had to be found, and Tennessee Valley Authority made several thousand acres of former agricultural land available to the refuge for that purpose.

The success of this work can be measured by the way the birds reacted to it. Use by the birds, at first slow to start, increased steadily. The first waterfowl count, made in 1939, showed not more than 1,500 ducks of all species and no geese using the refuge. By 1940, more than 3,000 ducks and a flock of 45 Canada geese were present. Increases have continued. Recent fall counts of ducks have reached peaks of more than 30,000, with 15,000 to 20,000 present throughout each winter. Canada geese are increasing steadily. A recent wintering flock numbered more than 2,000, and more than 4,000 geese visited the refuge during migration.

LONG BEFORE THE WHITE MAN CAME to this country, the land now forming the refuge was populated with Indians of unknown prehistoric tribes. Traces of them still remain. Earthen mounds and village sites can be seen on several parts of the refuge, and when reservoir levels are low, interesting artifacts can be picked up along the shore line. Clay and stone pots, stone axes, arrowheads, weights for nets, gorgets, and crude copper heads have been found. The interesting Folsom point (believed to be part of a stone age javelin), with its polished, rather than chipped, surface and grooved base, has been found and positively identified as such by the American Museum of Natural History. Human bones are seen commonly along the old river banks. Some of these ancient people disposed of their dead by stuffing the bodies, wrapped in a coarse cloth made of bark fiber, into crevices in the limestone caves found on some parts of the refuge.

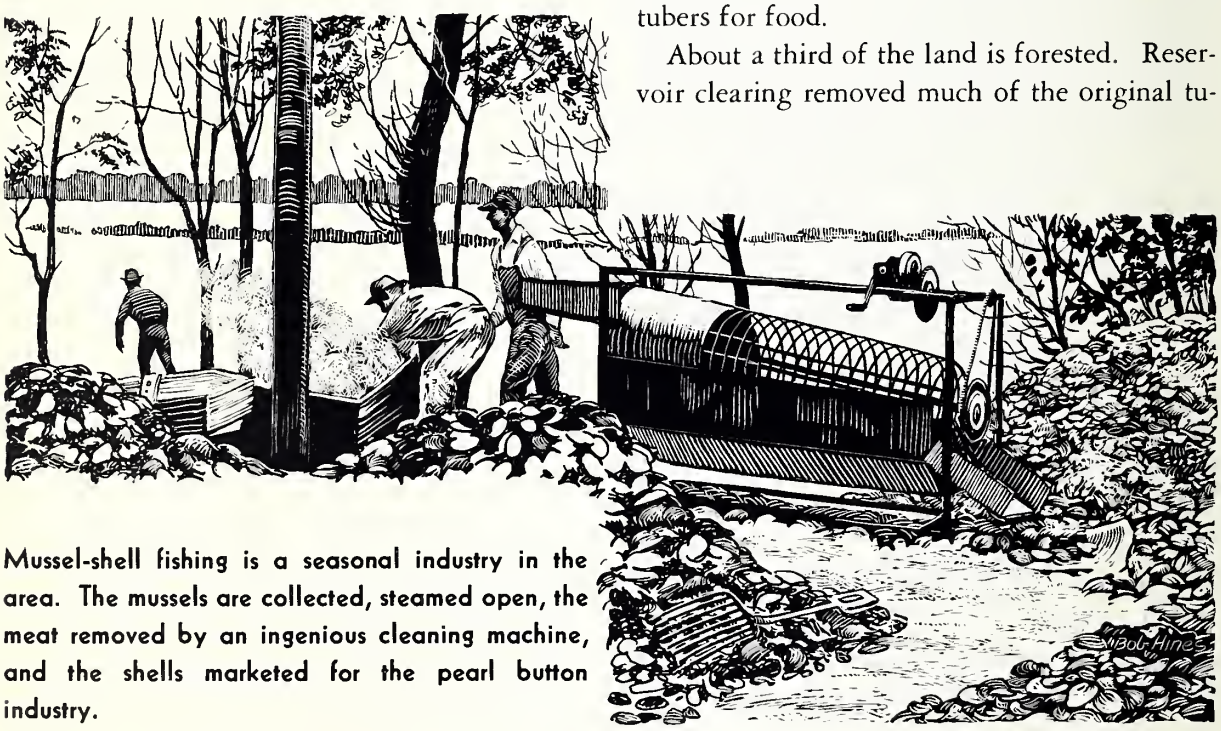
In historic times this was disputed territory and was fought over by the Muscogees, the Cherokees, and the Chicksaws, the ownership changing hands many times. White settlers purchased it from the Chicksaw Nation about 1815. These settlers moved from the Cumberland Valley into the Tennessee Valley in the early 1800's and founded the city of Hunt's

Spring, now Huntsville, a few miles north of the refuge boundary. The valley land was divided into large plantations and farmed principally to cotton. Steamboats picked up the bales in the fall and carried them down the Tennessee, Ohio, and Mississippi Rivers to New Orleans for shipment to foreign ports and to American cities on the northern Atlantic coast. During the War Between the States, this region was in the hands of the Confederate forces until the latter part of the war, when it was taken and held by Union troops. Relics and signs of the conflict are still present. Cannon balls have been found on the refuge, and the sites of old gun emplacements can be seen along the river banks. The refuge is named for Gen. Joseph Wheeler, one of the youngest and ablest generals in the Confederate Army and later a leading figure in the Spanish-American War.

THE PRESENT REFUGE AREA extends from Highway No. 31 and the city of Decatur up the Tennessee River 15 miles to Slaughter's Landing, and includes approximately 38,500 acres. When the reservoir is full, there are 22,000 acres of water and 16,500 acres of land. Shallow backwaters form the bulk of the water area, but a number of creeks and branches flow through the refuge. One of these, Village Creek, vanishes into the side of a low mountain and reappears on the opposite side. Large springs, locally called "blue holes," are common.

The water furnishes a resting place for wild fowl but produces little in the way of food, since the range of fluctuation is too great. The dominant aquatic plant is the American lotus, or yonkapin, with its huge, round, lilylike leaves and beautiful greenish-yellow blossoms. It is almost worthless as a waterfowl food, but the Indians used its acornlike seeds and starchy tubers for food.

About a third of the land is forested. Reservoir clearing removed much of the original tu-



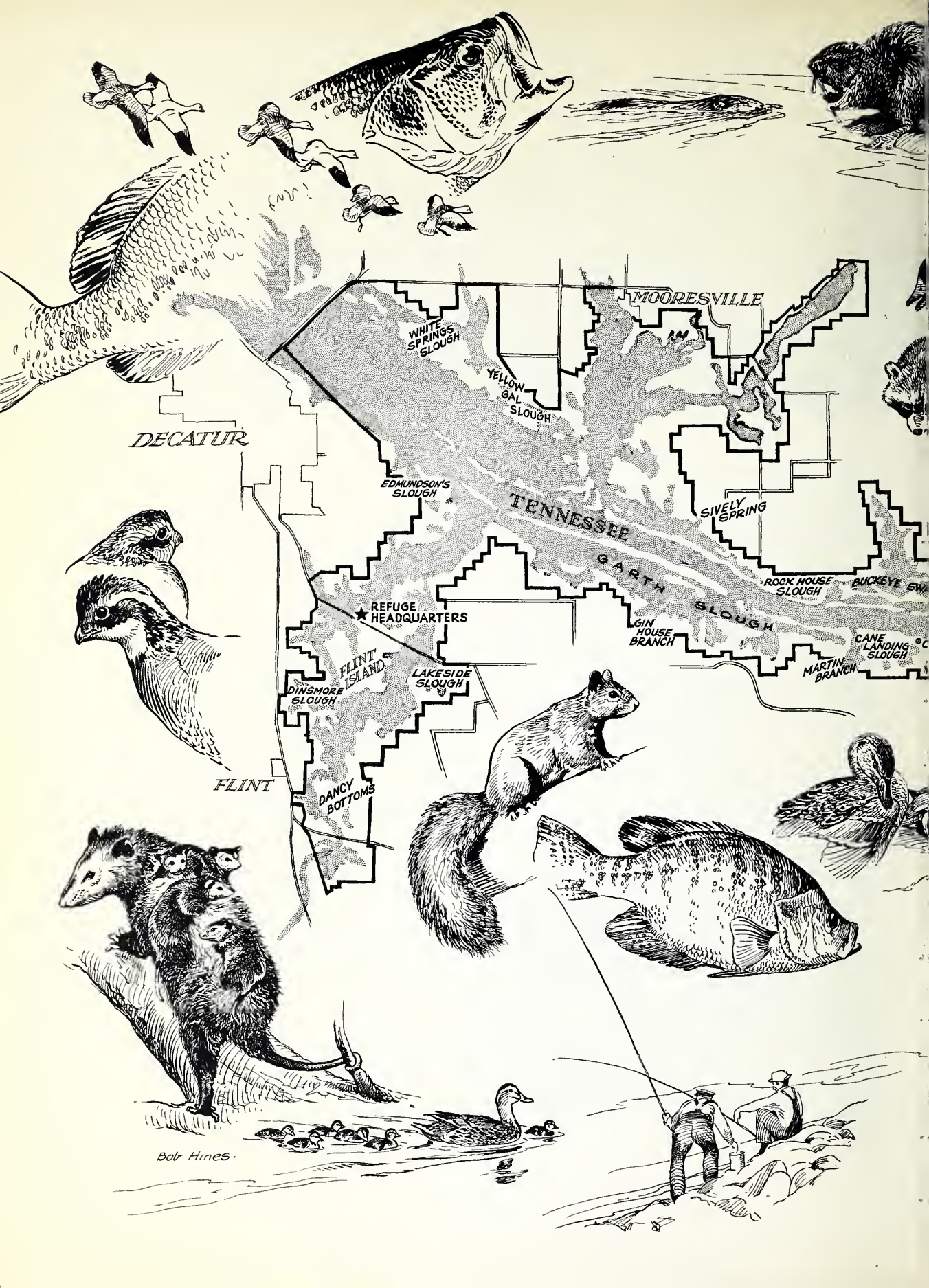
Mussel-shell fishing is a seasonal industry in the area. The mussels are collected, steamed open, the meat removed by an ingenious cleaning machine, and the shells marketed for the pearl button industry.

Wood ducks are among the waterfowl nesting on Wheeler. These birds, regarded as the most beautiful of American ducks, are seen more frequently in the timbered bottoms than in the open river.

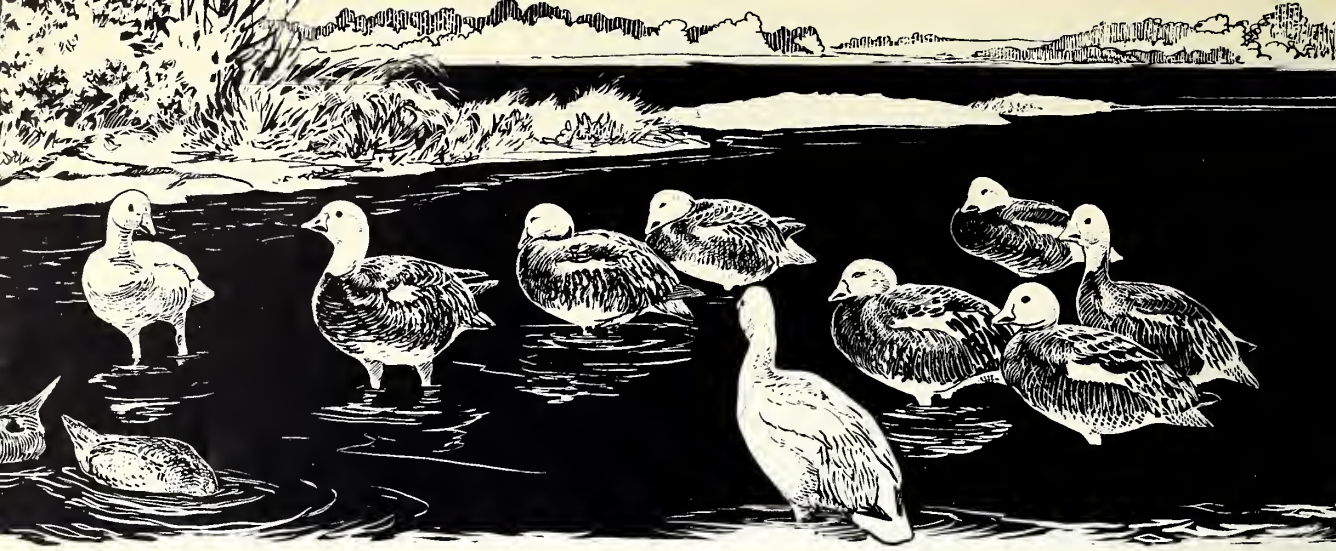
pelo swamp, but a limited acreage still remains, picturesque with its bottle-butted trees rising from the mucky soil and dark swamp water. On slightly higher elevations are found the typical bottom-land forests with stands of mixed hardwood species: oak, hickory, ash, elm, maple, gum, and hackberry. The Dancy Bottoms, Jolly Bottoms, Penny Bottoms, and Tally Bottoms are good examples of these hardwood forests and preserve specimens of the timber that once covered much of the valley. There are acres of plantations of loblolly and shortleaf pines and other species established during the Civilian Conservation Corps program to cover the eroded slopes and prevent the shifting soil from filling the reservoir.

On islands, peninsulas, and on the high land along the old river banks, approximately 3,000 acres of land are farmed for the refuge through cooperative crop and cash rental arrangements with local farmers. On refuge land farther away from the water, where waterfowl seldom feed, the Tennessee Valley Authority continues its agricultural leases through the local county agents' offices.

DURING THE HOT, STILL DAYS OF MIDSUMMER, great blue herons, little blue herons, American egrets, and green herons can be seen fishing in the shallow waters. Yellow-crowned night herons search for crayfish along the sloping slough banks and nest in the surrounding timber. Several hundred wood ducks make this their summer home and lay their eggs in the hollow trees. An occasional bald eagle may be sighted swinging over the backwaters on the lookout for a dead fish to take to its family. Grey squirrels are common in the woods. Cottontail and swamp rabbits, minks, raccoons, oppossums, foxes, and skunks are all present in considerable numbers. Muskrats den in the higher banks, and beavers are found on some of the tributary creeks. Because of the hot weather, the dense growth, and the wary nature of these wild creatures, they do not often come into view.


MOORESVILLE
WHITE SPRINGS SLOUGH
YELLOW GAL SLOUGH
DECATUR
EDMUNDSON'S SLOUGH
TENNESSEE
SIVELY SPRING
GARTH SLOUGH
ROCK HOUSE SLOUGH
BUCKEYE
REFUGE HEADQUARTERS
GIN HOUSE BRANCH
CANE LANDING SLOUGH
MARTIN BRANCH
FLINT ISLAND
LAKESIDE SLOUGH
DINSMORE SLOUGH
FLINT
DANCY BOTTOMS
Bob Hines.

Though primarily designed for the safety and convenience of migrating waterfowl, Wheeler is also host to many others around the year. Fishermen make all-season catches of large-mouth bass, striped-bass, crappies, bluegills, and other species. Muskrats live among the sedges and willows. Squirrels, opossums, and raccoons are plentiful, and shore birds make their seasonal visits in early spring and fall. Songbirds are numerous; doves and quail inhabit the fence rows and cultivated fields.



Blue and snow geese regularly winter on the refuge, although their numbers fluctuate from a few to several hundred.

A few broods of mallards and black ducks are raised each summer, and with the young wood ducks, add to the waterfowl supply of the approaching hunting season, but it is not until the first cool nights of September that the refuge begins to function as a wintering ground. The fall draw-down, to make space for winter floods, exposes hundreds of acres of stump-dotted mud flats. These are soon green with sprouting vegetation The vanguard of the flight, the blue-winged teal, begins arriving from northern breeding grounds. Shore birds from nesting grounds hundreds of miles away appear on the mud flats. Wilson's snipe, greater and lesser yellowlegs, and semipalmated plovers, along with least, pectoral, semipalmated, spotted, and solitary sandpipers, are all common.

Occasionally, willets, knots, black-bellied plovers, stilt and white-rumped sandpipers, and Hudsonian curlews stop briefly. Woodcocks come into the thickets. Mourning doves increase as northern birds add to the numbers of those that summered and nested on the refuge. The bulk of these will move farther south to the peanut belt late in the fall, but some will remain throughout the winter.

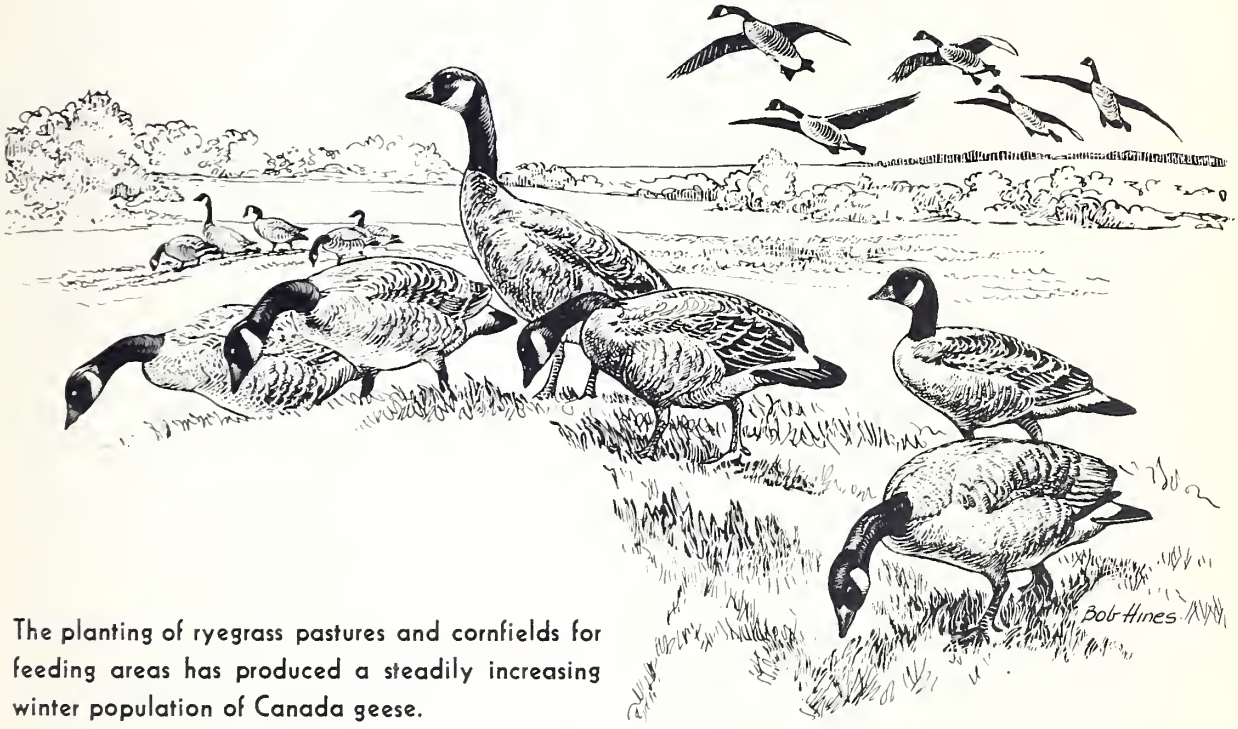
In late September and early October, pintails and a few migrant mallards and black ducks arrive. Coots appear on the sloughs. The trickle of birds is beginning to run a fair-sized stream. By mid-October the first flock or two of Canada geese can be seen grazing on the young spikerush on the mud flats. Flocks of blue geese—the old birds with slaty bodies and white heads and necks, and young birds with their solid grey color—stop to rest on their long journey from their summer home north of the Arctic Circle to their wintering grounds on the Gulf Coast. Depending probably on breeding conditions in the bleak north and on climatic conditions during migration, this species is abundant during some falls, much less numerous in others. There were 2,000 blue geese on the refuge in 1939, 6,000 to 8,000 in 1945, and only a few hundred during other years.

Mixed with the flocks of blue geese are some snow geese, with their pure white bodies and jet black wing tips. They bear the scientific name of *Chen hyperborea,* which, freely translated,

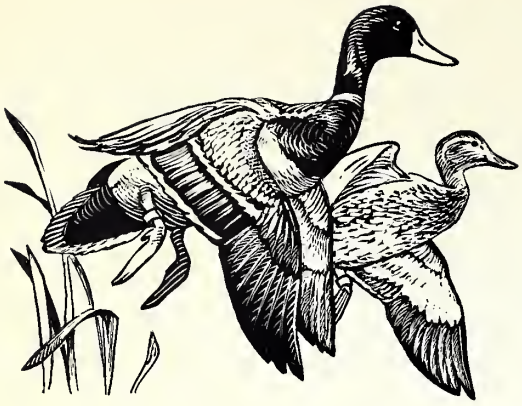
means "the goose from beyond the north wind." Seen moving through the air in large flocks, they may remind the observer of snowflakes. Although these birds are regular fall visitors, they are extremely rare in spring, because they pursue a different route along the west side of the Mississippi River on their northward migration.

By mid-November, the bulk of the birds have arrived, and the sloughs and mud flats are filled with them by day and the refuge grainfields by night. The silence of summer is gone, replaced by a tumult of wild sounds: the honking of the Canada geese, the high-pitched "yip-yipping" of blue and snow geese, the quacking of the mallards, and the soft whistling of the baldpates. By early December the egrets and the blue and snow geese have passed southward to the coastal marshes, but fresh arrivals replace them. More ducks and Canada geese come in, along with greater numbers of hooded, red-breasted, and American mergansers, double-crested cormorants by the hundreds, pied-billed grebes, loons, and increasing numbers of ring-billed and herring gulls. The peak of the winter population is usually reached in the last two weeks of December and the first two weeks of January.

Late January sees most of the grainfields picked bare and the hunting season over. The geese remain to graze on the fields of winter



The planting of ryegrass pastures and cornfields for feeding areas has produced a steadily increasing winter population of Canada geese.



grain, but the ducks have a tendency to disperse, and the refuge population drops somewhat. In February, geese from the south—probably those that spend the midwinter on the marshes of the Gulf of Mexico—arrive, adding to the numbers of those already present. This is the time for geese, and they can be seen everywhere on the fields of winter grain, alfalfa, and crimson clover. Ducks that wintered farther south—pintails, ringnecks, and baldpates—pass through.

The big mallard makes up 65 percent of the winter duck population. Black ducks, baldpates, and pintails vie for second place. Fourteen other species comprise the remainder. March usually finds the birds leaving for their nesting grounds. Blue-winged teal, absent since early November, are back again for a brief stay. Shovelers, now in their gaudy spring plumage, pass through in some numbers. The egrets return from the Gulf Coast and Central America and, together with the great blue herons, begin nesting in the large rookery in Beaver Dam swamp. By late April the migrants are gone. The refuge has settled down to its routine of summer work to prepare again for the coming of the waterfowl in the fall.

WATERFOWL BANDING AT WHEELER BEGAN IN 1941. Since this refuge does not lie on any of the principal routes of bird migration, it was important to determine where the flocks were coming from and where they nested, and to correlate this information with that obtained from the network of banding stations scattered over the continent. The banding work has been continued each winter. Banding traps are placed in shallow water and baited with corn. Ducks enter during the night and are removed and banded early the next morning.

Waterfowl banding has a charm that is felt by all who participate in it. Species are so different, so varied in appearance, so mysterious in their comings and goings. There is a sense of anticipation in the morning journey to the traps. They may contain the usual mallards and black ducks, beautiful enough, but so common as to arouse little interest. Then again, the catch may include pintails, indescribably graceful in flight, or baldpates with their soft dovelike pastel colors, or a pugnacious coot, not a duck at all but a member of the rail family. Rarely, mixed with the larger ducks, one finds a green-winged teal, as small and delicate as a fairy duck, or a drake wood duck in his wedding garb, gorgeous with metallic purples, bronzes, greens, and blues—a touch of tropical warmth amid the cold northern Alabama winter.

Banding is not all fun. The trapper wears hip boots and long raincoat, and the frightened birds splash him with icy water that freezes on his clothing. The birds are unhurt and are carried to the shore where the aluminum bands bearing serial numbers and the words "Notify Fish and Wildlife Service, Washington, D. C.," are carefully placed on them. The thrill of re-

leasing the birds is even greater than the thrill of catching them. The pintail drake leaves his captor's hands and gathers the cold February air under his long wings. Soon, the bander knows, he will be speeding northward again. He may rest awhile in the cypress-dotted waters of Reelfoot Lake. He will probably feed in the headwaters of the upper Mississippi, swollen by spring floods. He may pause briefly on the shores of Lake Superior, and then he and his mate will nest near some reed-bordered pond in Saskatchewan or Alaska. He may die under the power dive of a duck hawk, or a wandering mink may find his roosting place. If all goes well, he and his family will join the southward flight in September and run the gauntlet of guns down the Mississippi flyway. By winter he may again have found his way to Wheeler Refuge, one of the tiny islands of safety in his journeys over a third of the length of the North American Continent.

More essential work prevents the spending of large amounts of time on banding, but several hundred birds are trapped and banded at Wheeler each winter. Of the nearly 2,000 banded by 1948, returns have come in from 18 States and 4 Canadian Provinces. This information shows that the ducks that winter on Wheeler nest in the Lake States and the Prairie Provinces of Canada. In the fall they follow the Mississippi Valley, that broad waterfowl highway leading from the Great Lakes to the Gulf of Mexico. Near the mouth of the Ohio River they veer away from the southbound birds and move eastward up from the Tennessee River. The bulk of those finding their way to Wheeler remain for the winter, although a few, especially the ringnecks, pintails, and baldpates, continue farther south.

MANAGEMENT OF THE REFUGE IS DESIGNED chiefly to provide a wintering ground for migrant waterfowl, but the area also gives protection to thousands upon thousands of other birds. With its varied habitat of hillside and bottom land, forest, hay meadow, cropland, brush and weed fields, marsh, open slough, and creek channels, it shelters a wealth and variety of bird life. The 213 species which have been observed include the white pelican, white-fronted goose, whistling swan, white-winged scoter, horned grebe, ground dove, and many others that are rare records for northern Alabama.

Protection of the birds and food protection through farming are the two most important phases of refuge work at Wheeler. The dense human population and the narrow and irregular shape of the refuge make frequent patrol necessary. The almost total lack of any natural foods makes the planting of grain and green browse crops essential. To carry on this work, patrol roads must be built and kept passable. Culverts must be installed and bridges kept in repair. Long fills must be built and maintained to give passage into some of the better farming areas. Dikes must be constructed and trees with fibrous

root systems planted along the river banks to prevent flood waters from washing away some of the better fields. Hedgerows and clumps of brush must be removed from some areas, since ducks and especially geese are reluctant to feed near cover. Rye grass must be sown on the mud flats to provide early green food for waterfowl. Control structures have been built in the inlets of some of the larger sloughs to enable the holding of high water levels in the fall when reservoir levels are generally low, and these must be cared for. Refuge grounds, buildings vehicles, boats, and other equipment must be maintained.

Establishment of the refuge has had little effect on the economic value of the area, and its monetary contribution to the local economy is still large. All land suitable for agriculture, hay, or grazing is rented to local farmers, either by the refuge manager or through the local county agent. Timber is sold when the foresters of the Tennessee Valley Authority and of the Fish and Wildlife Service consider it mature enough for logging. Commercial fishermen are restricted only by the laws and regulations of the State Department of Conservation and only its license is required. Thousands of dollars worth of catfish, drum, buffalofish, and carp are caught in refuge waters and sold each year. Freshwater mussels are an important source of revenue to local rivermen. Valuable pearls are sometimes found in these mollusks, and misshapen pearls, called "slugs," are common. The shells are used for the manufacture of buttons handles, and ornaments. Shelling takes place only during warm weather, and there is no interference with wintering waterfowl. No restrictions are placed on this industry, and several hundred tons of shells are sold each season.

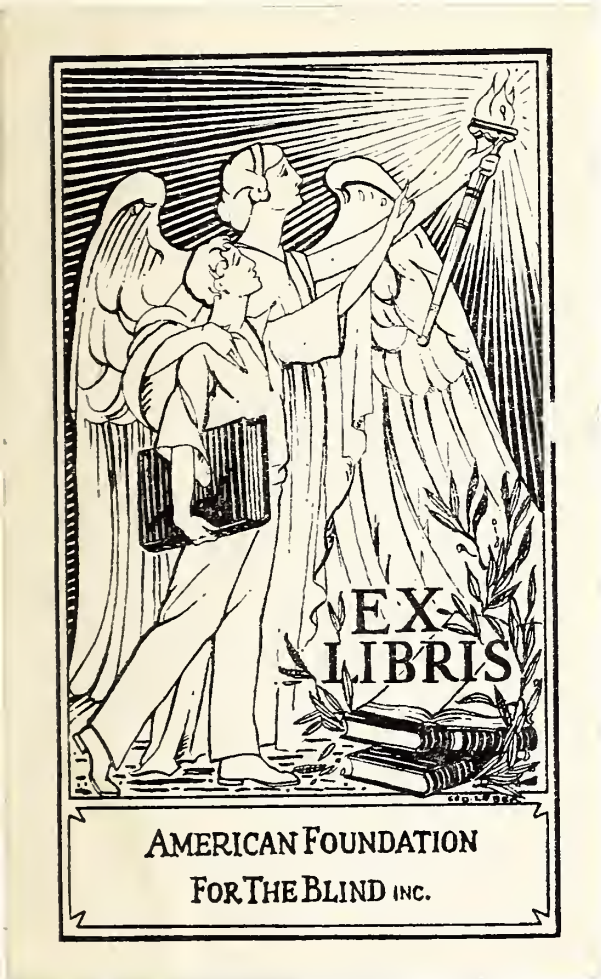
The public is welcome on the refuge at any time, and no visiting permits are necessary. Sport fishing draws hundreds of people to the reservoir, and thousands of pounds of bass, crappie, and blue gills are caught annually. Boating, picnicking, and photography are allowed without restrictions. The water is not suitable for bathing, however, and since malaria is an ever-present threat, no overnight camping is allowed.

Even hunting is permitted at times. During past years, trapping fur animals, as well as shooting quail, squirrels, and rabbits, have been allowed under special permit. Refuge protection and management have caused nonmigratory game to increase markedly, and when populations build up to sufficient numbers, public hunts are held to remove the surplus. The squirrel hunt in October has been an annual event for some years. Several hundred permits are issued without charge, and each permit allows several days of squirrel shooting.

The refuge has improved local hunting and trapping. The hunting of quail, squirrels, and raccoons on private lands adjoining the area is better than that in northern Alabama as a whole. Trapping has shown marked improvement as fur animals spread from the refuge to nearby private streams and wood lots. Of the 172,000 acres of water created by the Tennessee Valley Authority in northern Alabama alone, the refuge has removed only 12 percent from public shooting. Waterfowl hunting on the nonrefuge part of Wheeler reservoir is considerably better than that on the adjoining Pickwick and Guntersville reservoirs, since the refuge tends to hold a local concentration of birds which are continually spreading into the open shooting areas.

Wheeler Refuge began with a residual waterfowl population of less than 2,000 ducks and

no Canada geese. The area is highly artificial as contrasted with the typical refuge, which contains extensive permanent habitat. Only through careful protection and intensive management to produce food on adjacent agricultural lands has it been possible on the Wheeler Refuge to build waterfowl populations up to their present levels. This has been done on an area subject to considerable water fluctuations and great human interference, and almost totally lacking in natural foods. Experience at the Wheeler Refuge gives hope that other artificial impoundments, managed and developed with equal care, may also come to play an important part in the preservation of American waterfowl.



The Wheeler National Wildlife Refuge is easy to reach by any means of travel. Its western end extends into the city limits of Decatur, and its northeastern boundary is within a few miles of the city of Huntsville. There are good hotels and good bus and train connections in both cities. Pryor Field, the Decatur airport, lies just north of the refuge boundary, a few miles from Decatur. United States Highway No. 31 forms the western boundary of the area. State Highway No. 67 runs through its southern side, and State Highway No. 20 parallels the northern boundary. (See map on back page.)

PRINCIPAL WATERFOWL REFUGES OF THE MISSISSIPPI FLYWAY

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